

REMARKS

Claims 1, 3 and 5-9 remain in this application. Claims 1 and 9 have been amended to more clearly define the differences between the claimed invention and the prior art. All claims stand rejected under 35 U.S.C. §103 as obvious over Taniguchi (823) in view of Krivanek (255). Applicants respectfully traverse this rejection.

In essence, the difference between the claimed invention and the references is that Taniguchi is directed to a TEM that requires a plurality of imaging operations to acquire a distribution image of only one element contained in an object to be analyzed because of the use of the TEM. On the other hand, the claimed invention is directed to the combination of a STEM and an EELS, in which a distribution image of plural elements contained in the object to be analyzed is acquired in a single imaging operation to give an improved mapping unit. The claims amendments bring this out more clearly. More specifically, the following differences have been noted in the past.

"Taniguchi is directed to a non-scanning type of transmission electron microscope. In Taniguchi, the electron beam is accelerated before irradiation onto the sample by adjustment of the electron gun, and the electron beam is irradiated on the sample in one area. Furthermore, as can be clearly seem from the passage at column 7, lines 11-30:

An arithmetic image processing unit 14 compares the images of the frame memories 11a and 11b with each other through arithmetic processing, the results of which are successively outputted to a monitor 15. The arithmetic processing executed by the arithmetic image processing unit 14 is either an inter-image subtraction processing or an inter-image division processing. An intensity regulation unit (also referred to as amplitude regulation unit) 12 is a mechanism for attenuating the intensity of the energy-filtered image inputted to the frame memory 11b uniformly with a predetermined ratio. It is presumed that the ratio of attenuation can arbitrarily be selected. The ratio of attenuation may be selected to be "1" (unity), although it is unnecessary when the inter-image division processing is performed.

Next, a procedure for observing a distribution or map of those elements constituting the specimen which have core-loss energy of ΔE will be described by reference to a time chart of Fig. 2 together with Figs. 3A-3G. Parenthetically, it should be mentioned that in the case of the example illustrated in Figs. 3A-3G, the inter-image subtraction processing is applied.

Thus, Taniguchi requires two or more energy filtered images observed with different acceleration voltages at different timings for observing element distribution. Therefore, Taniguchi inherently requires a plurality of images and thus requires a period for obtaining two or more images. In practice, Taniguchi requires about one hour for observation (two or more times of observation, each requiring 20 to 100 seconds, and an image processing period of 30 minutes to one hour). Furthermore, in Taniguchi, the element distribution has to be obtained for each view field in accordance with the constraints set forth above.

In contrast to this, the claimed invention is directed to a scanning transmission electron microscope (STEM), in which electron beam passed through the sample is accelerated by adjusting a voltage of an acceleration tube built in an electron spectrograph, and the electron beam is scanned on the same in a form of small diameter probe. In the case of the scanning transmission electron microscope of the claimed invention, an element distribution image can be obtained by real time operation by simultaneously measuring electron beams of different energies. Thus, the claimed invention permits observation of element distribution images of high contrast within a period of about several seconds to 80 seconds. Furthermore, the claimed invention permits real time view field selection, switching of elements to be observed and magnification selection, along with observing the element distribution image."

The Examiner's mention of inter-image operations in his rejections recognizes that multiple images are needed in Taniguchi. For example, the claimed division, that the examiner contends is found in the reference based on inter-image division, calls for this. As is clear from the claims, division in the present invention does not take place between two images but between different detected beam intensities in a single scanning operation. Similar comments apply to the rejection of claim 5.

Nothing in Krivanek makes up for the teaching missing in the primary reference to Taniguchi.

In view of the above, Applicants believe that all claims remaining in this application are in condition for allowance, prompt notice of which is respectfully solicited.

The Examiner is invited to call the undersigned at (202) 220-4200 to discuss any information concerning this application.

Applicants respectfully request a two-month Extension of Time to respond to the Office Action of June 3, 2004. The extended period expires November 3, 2004.

The Office is hereby authorized to charge the fee of \$430.00 for a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) and any additional fees under 37 C.F.R. § 1.16 or § 1.17 or credit any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,



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